ORIGINAL RESEARCH

Factors associated with knowledge and awareness of Hepatitis B in individuals of Chinese descent: Results from a mass point of care testing and outreach campaign in Toronto, Canada

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ABSTRACT

BACKGROUND: Migrants from hepatitis B virus (HBV) endemic regions are at high risk of having chronic infection. Despite this, HBV knowledge and awareness programming, and low-barrier screening methods such as point of care (POC) testing, among this group have yet to become routine. **METHODS:** We conducted a mass HBV POC screening and knowledge and awareness campaign for individuals of Chinese descent in Toronto, Canada. POC screening was administered, then participants completed a knowledge questionnaire. Logistic regression identified associations between demographic factors and participants' level of HBV knowledge. **RESULTS:** From 2015 to 2018, 33 outreach events resulted in 891 individuals completing testing and the knowledge questionnaire. Individuals averaged 64.4 years old. Most, 62% (*N* = 552), were female, and 73.6% (*N* = 656) have been in Canada for <30 years. The average questionnaire score was 70.7% correct, with 65.2% (*N* = 581) demonstrating a high level of HBV knowledge. Post-secondary education (OR: 2.19, 95% CI: 1.41, 3.39), income of $50,000 to <$75,000 (OR: 2.74, 95% CI: 1.39, 5.43), and having familial history of HBV (OR: 1.72, 95% CI: 1.06, 2.78) were associated with high knowledge. The observed prevalence of HBV was 1.5%, with 13 individuals testing positive on the POC test and confirmatory laboratory testing. **CONCLUSIONS:** Improving knowledge and awareness of HBV is critical to empowering people, especially migrants who experience barriers to care, to pursue vaccination, testing, and treatment. Combining knowledge outreach and POC test campaigns, enabled discussion and screening for HBV with large numbers of people, and can be tailored for optimal effectiveness for specific groups.

KEYWORDS: hepatitis B; knowledge; migrants; point of care testing (POCT); screening

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LAY SUMMARY: Migrants to Canada from hepatitis B virus (HBV) endemic regions are at high risk of having chronic HBV infection, but often face barriers to getting tested, vaccinated, or treated. Targeted screening and educational campaigns can improve HBV awareness and promote the uptake of testing, prevention, and treatment. Our study examined HBV knowledge and awareness among people of Chinese descent in Toronto, Canada. As part of a mass outreach campaign, we offered point of care (POC) testing and asked people to complete a knowledge questionnaire to see how much they knew about HBV. The average score people achieved on the knowledge questionnaire was about 70%, with 65% of individuals demonstrating a high level of HBV knowledge. High knowledge score was associated with people who had post-secondary education, higher income, and/or familial history of HBV. Targeted outreach campaigns that combine POC testing with HBV education may be a viable strategy to empower individuals to discuss and learn more about HBV and their health.

BACKGROUND

Hepatitis B viral (HBV) infection is a significant source of morbidity and mortality due to its association with cirrhosis and hepatocellular carcinoma (HCC). In Ontario, HBV remains an important public health concern, causing more years of life lost than both human immunodeficiency virus (HIV) and influenza (1). The asymptomatic nature of HBV infection necessitates screening and counselling to reduce transmission for those at higher-risk of infection (2). Without treatment, an estimated 20% to 25% of HBV carriers will develop cirrhosis and 5% to 6% will develop HCC (3). Despite Canada being identified as a region of low endemicity, HBV bears a disproportionate impact on certain populations, particularly migrants from endemic regions of the world (4). Among all migrants in Canada, the prevalence of chronic HBV has been estimated to be 5% (5).

Previous research has demonstrated that in low-endemic counties such as the Netherlands and the United States, migrants from China have demonstrated HBV prevalence as high as 9% (6,7). According to research conducted by the Canadian HBV Network, 73.8% of those receiving care for HBV in Canada are migrants from Asia (8). Despite this, to date, screening for chronic HBV among migrants is not a routine practice. Among migrant populations with well-documented social, linguistic, and systematic barriers to accessing health care services, current recommendations for opportunistic HBV screening by clinical professionals has had limited success in identifying new HBV cases and linking those infected to timely care (9).

In 2016, the World Health Organization released a global health strategy for the elimination of viral hepatitis as a public health threat by 2030, setting country-wide targets for reductions in incidence of HBV infection and HBV-related deaths (10). As a part of Canada's commitment and endorsement of the WHO strategy, the Canadian Association for the Study of the Liver (CASL) has recommended HBV screening for immigrants to Canada from endemic countries during their medical evaluation (2). Targeted educational campaigns that emphasize public awareness and knowledge as means to promote the uptake of HBV testing, treatment, and preventative measures will be necessary to achieve the targets for viral elimination (11).

Toronto is home to some of the largest migrant populations in Canada, including more than 500,000 people of Chinese ethnicity (12). Our study objective was to implement an outreach campaign to evaluate the level of awareness and knowledge of HBV within a large population of individuals of Chinese descent in the Greater Toronto Area.

METHODS

Study design and participants

In this cross-sectional study, eligible individuals were offered participation in an HBV outreach campaign that consisted of HBV surface antigen (HBsAg) point-of-care (POC) testing and the option of completing a questionnaire on HBV knowledge and awareness. The outreach campaign consisted of a two-phased rollout, first offering testing, and participation in the questionnaire to individuals of Chinese descent which later was expanded to individuals of all descents due to interest in the campaign from other ethnic groups. Participants were excluded if below 18 years of age, had a history of current or past antiviral therapy, or known history of HBV. To be consistent with the original purpose of the outreach campaign to examine knowledge and awareness of HBV within individuals of Chinese descent, only those of Chinese descent were included in the study cohort.

From 2015 to 2018, recruitment of participants was done in-person at shopping malls, health fairs and facilities, and educational events across the Greater Toronto Area (GTA).

The study was approved by the University Health Network Research Ethics Board. All participants signed two copies of an informed consent form and were given one copy to keep.

The outreach campaign

At enrollment, basic demographic information was collected consisting of date of birth, sex, contact information, and self-reported ethnicity. Participants received a POC test administered by a qualified member of the outreach campaign team. POC testing was conducted using a finger-prick blood sample and the Determine™ HBsAg test kit (Alere International Limited, Ballybrit Galway, Ireland). This test kit can detect the presence or absence of HBsAg within 15 minutes with a sensitivity and specificity of 95.16% and 99.95%, respectively (13). In addition to the POC test, a 5 mL venous blood sample was collected at the same time, which was used for confirmatory HBV testing and provided by the Microbiology Lab at Mount Sinai Hospital.

POC test results were read by the tester and communicated to the participant. Participants with a positive confirmatory test result were provided post-test counselling, educational brochures, and were followed up with a health care professional by phone for referral to a liver specialist at the Toronto Centre for Liver Disease (TCLD). Results were also reported to the Medical Officer of Health according to guidelines for HBV as a reportable disease (14).

Participants who opted to fill out the knowledge and awareness questionnaire also provided more detailed demographic information that included: familial history of HBV, income level, educational attainment, marital status, immigration status, and employment status. The HBV knowledge and awareness questionnaire consisted of 13 questions composed from three categories: HBV transmission (four questions), HBV consequences (six questions), and HBV treatment (three questions). The questionnaire was translated into Chinese and was administered by an outreach team member.

Outreach teams

Outreach teams consisted of nurse practitioners, nurses, study coordinators, research assistants, and volunteers from the Toronto Centre for Liver Disease (TCLD), Viral Hepatitis Care Network (VIRCAN), an academic-community partnership organization, and the Chinese Hepatitis B Peer Support Group, a HBV support group and networking platform for patient representatives and volunteers of Chinese descent.

Statistical analysis

Continuous variables were described using mean and standard deviation. Categorical variables were described using counts and proportions. For categorical variables, responses were collapsed into broader sets of categories due to low event frequencies and for clarity in interpretation. Missing answers or responses of 'other' and/or 'prefer not to answer' were categorized as missing. The overall HBV knowledge score and scores by category were determined based on the sum of the correct answers to the knowledge and awareness questionnaire. One point was awarded for each correct answer. Missing or incorrect responses were not given a point. Mean score was tabulated based on the percentage of questions answered correctly. Overall HBV knowledge scores were dichotomized into 'low' or 'high' knowledge, with overall scores greater than or equal to 9 (of 13) correct answers considered 'high' knowledge and overall scores less than 9 considered 'low' knowledge.

The association between predictors and having low or high HBV knowledge was estimated using regression. Missing values for predictors were handled by multiple imputation by chained equations (MICE) (15,16), generating 50 iterations of 20 imputed datasets. MICE employed predictive mean matching for continuous variables and logistic regression for categorical variables with missing values. On the resulting pooled data, multivariable logistic regression was performed to identify associations between characteristics and high HBV knowledge score. Findings are presented as exponentiated adjusted odds ratio's (OR) and their associated 95% confidence interval (CI). As a sensitivity analysis, complete case analysis was used omitting participants with missing values for predictors. Data were analyzed using R version 3.6 (R Core Team).

RESULTS

Cohort characteristics

After 33 outreach events, a total of 1,506 individuals were approached to participate in the study,

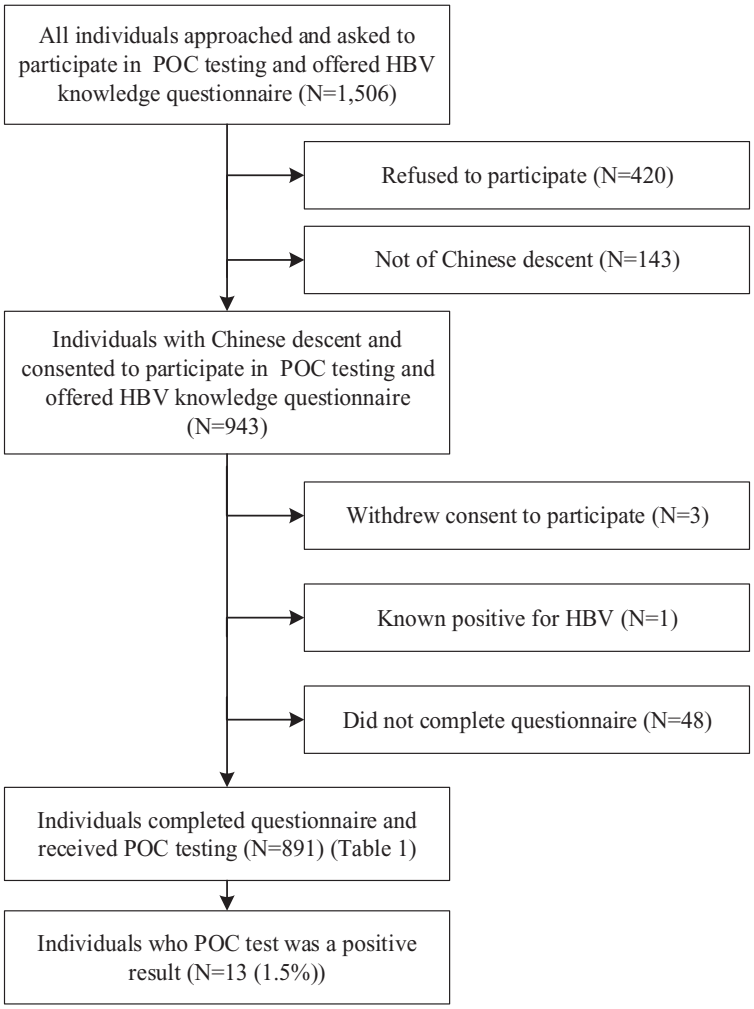

Figure 1: Study enrollment and cohort attrition diagram

HBV = hepatitis B virus; POC = point of care

of whom 1,086 (72.1%) consented to participate (Figure 1). Among those who declined, common reasons included lack of interest, previously tested for HBV, and 'already having received HBV vaccination'. Of all who consented to participate, 943 (86.8%) individuals were of Chinese descent (Figure 1). After exclusion criteria and removal of 48 individuals who did not complete the questionnaire (all extended demographic information and/or all HBV knowledge questionnaire answers missing), 891 individuals remained and were included in the study cohort (Table 1). Of the cohort, 13 individuals tested positive for HBsAg (prevalence of 1.5%).

On average, participants were aged 64.4 (SD: 13) years, 62.0% (*N* = 552) were female, and 73.6% (*N* = 656) were immigrants who have been in Canada for <30 years. Post-secondary education was attained by 47.6% (*N* = 424). Among participants, 26.4% (*N* = 235) were employed and 54.2% (*N* = 483) were retired. An income level of less than $25,000 annually was most common (43.4% [*N* = 387]) among the cohort. Most participants, 68.8% (*N* = 613) were married. Approximately half of participants, 50.6% (*N* = 451), reported no familial history of HBV.

Knowledge score

Knowledge and Awareness Questionnaire responses are recorded in Table 2. Overall, the average total score was 9.2 (SD: 2.8) out of 13 or 70.8% correct. The median total score was 10 (IQR: 8–11) out of 13 or 76.9% correct. Of all participants, 34.8% (*N* = 310) of individuals had low HBV knowledge (below 9 correct out of 13), and 65.2% (*N* = 581) had high knowledge (greater than or equal to 9 correct out of 13). Stratified demographics by individuals with low and high HBV knowledge can be found in Table S1.

When divided into categories (Table 2), the HBV transmission category had the lowest average

Table 1: Demographics of survey respondents

Characteristic	Overall (*N* = 891)
Age, Mean (SD)	64.4 (13.0)
Missing	33
Age category. *N* (%)	
18–34	25 (2.8%)
35–54	141 (15.8%)
55–74	508 (57.0%)
75+	184 (20.7%)
Missing	33 (3.7%)
Sex, *N* (%)	
Female	552 (62.0%)
Male	328 (36.8%)
Missing	11 (1.2%)
Education, *N* (%)	
None or Primary	136 (15.3%)
Secondary	306 (34.3%)
Post-secondary	424 (47.6%)
Missing	25 (2.8%)
Employment, *N* (%)	
Unemployed	140 (15.7%)
Employed	235 (26.4%)
Retired	483 (54.2%)
Missing	33 (3.7%)
Marital status, *N* (%)	
Single/Never married	103 (11.6%)
Married or Common Law	613 (68.8%)
Divorced, widowed or separated	141 (15.8%)
Missing	34 (3.8%)
Income, *N* (%)	
<$25,000	387 (43.4%)
$25,000 to <$50,000	135 (15.2%)
$50,000 to <$75,000	79 (8.9%)
>$75,000	68 (7.6%)
Missing	222 (24.9%)
Familial history of HBV, *N* (%)	
No	451 (50.6%)
Yes	117 (13.1%)
Do not know	207 (23.2%)
Missing	116 (13.0%)
Migrant status, *N* (%)	
Born in Canada or >30 years in Canada	217 (24.4%)
Immigrant <30 years in Canada	656 (73.6%)
Missing	18 (2.0%)
HBV screening result, *N* (%)	
Positive	13 (1.5%)

HBV = Hepatitis B Virus; SD = standard deviation

score of 2.3 (SD: 1.3) correct out of 4 or 57.5% and a median of 3 (IQR: 1–3) or 75.0% correct. Within the transmission category, the question of transmission of HBV through means of sharing food, drink, or eating utensils was answered incorrectly by 49.8% (*N* = 444) of individuals. The HBV treatment category had an average score of 2.1 (SD: 0.9) correct out of 3 or 70.0% and the lowest median score of 2 (IQR: 2–3) or 66.7% correct. In the treatment category, the question asking participants whether people with HBV should be avoided was answered the most incorrectly (34.0% [*N* = 303]). The HBV consequences category had an average score of 4.7 (SD: 1.5) correct out of 6 or 78.3% correct and median of 5 (IQR: 4–6) or 83.3% correct. Within the consequences category, the question asking participants if they knew whether HBV infection can last a lifetime had the most incorrect answers (20.0% [*N* = 178]).

Factors associated with HBV knowledge score

Table 3 shows the findings of the multivariable logistic regression analysis with all selected predictors and high HBV knowledge score after using a multiple imputation approach to account for missing data. Post-secondary education (OR: 2.19, 95% CI: 1.41, 3.39) compared to none or primary education, income of $50,000 to <$75,000 (OR: 2.74, 95% CI: 1.39, 5.43) compared to <$25,000, and having a familial history of HBV (1.72, 95% CI: 1.06, 2.78) were significantly associated with having a high HBV knowledge score.

Multivariable regression estimates using the MICE approach were contrasted against a complete case analysis approach where, of the 891 participants, 60.8% (*N* = 542) had complete data (Table S2). Results were consistent with the MICE approach, with one exception: secondary school education (OR: 1.77, 95% CI: 1.04, 3.02) was associated with high HBV knowledge compared to the reference level of none or primary education.

DISCUSSION

This study utilized an outreach campaign that included HBV POC testing and evaluated HBV knowledge and awareness among individuals of Chinese descent in the GTA. Based on the number of correct answers on the questionnaire, participants had the highest understanding of the consequences of having HBV, and had less knowledge about HBV treatment and transmission. Multivariable analysis revealed associations between higher

Table 2: Participant responses to HBV knowledge questionnaire (*N* = 891)

	Response			
Question (correct response)	Yes, *N* (%)	No, *N* (%)	Do not know, *N* (%)	Missing, *N* (%)
HBV transmission				
1. Do you think hepatitis B can be spread by sharing food, drink, or eating utensils? (No)	444 (49.8)	302 (33.9)	145 (16.3)	0 (0.0)
2. Do you think hepatitis B can be spread by sharing razors? (Yes)	572 (64.2)	162 (18.2)	157 (17.6)	0 (0.0)
3. Do you think hepatitis B can be spread by sexual contact (intercourse)? (Yes)	536 (60.2)	153 (17.2)	199 (22.3)	3 (0.3)
4. Do you think hepatitis B can be spread from mother to child during childbirth? (Yes)	657 (73.7)	78 (8.8)	155 (17.4)	1 (0.1)
HBV consequences				
5. Do you think hepatitis B can be serious? (Yes)	699 (78.5)	111 (12.5)	81 (9.1)	0 (0.0)
6. Do you think hepatitis B can cause liver damage such as scarring and cirrhosis? (Yes)	782 (87.8)	18 (2.0)	90 (10.1)	1 (0.1)
7. Do you think hepatitis B can cause liver cancer? (Yes)	750 (84.2)	33 (3.7)	107 (12.0)	1 (0.1)
8. Do you think hepatitis B infection can last for a lifetime? (Yes)	556 (62.4)	178 (20.0)	156 (17.5)	1 (0.1)
9. Do you think people can die from hepatitis B? (Yes)	631 (70.8)	150 (16.8)	110 (12.3)	0 (0.0)
10. Do you think treatment for hepatitis B can prevent liver disease from getting worse (Yes)	772 (86.6)	34 (3.8)	84 (9.4)	1 (0.1)
HBV treatment				
11. Do you think there is a vaccine for hepatitis B? (Yes)	655 (73.5)	64 (7.2)	172 (19.3)	0 (0.0)
12. Do you think you should avoid anyone with hepatitis B? (No)	303 (34.0)	510 (57.2)	78 (8.8)	0 (0.0)
13. Do you think having blood drawn for testing can deplete the body of energy? (No)	86 (9.7)	749 (84.1)	54 (6.1)	2 (0.2)

Note: Correct answers to each question are in parentheses.
HBV = Hepatitis B virus

levels of education, income, and familial history of HBV and high HBV knowledge score.

In Ontario, the prevalence of HBV among all immigrants has been estimated at 3.4%, ranging to 9.4% among immigrants specifically from high-endemic countries (17). In this cohort, we observed a lower HBsAg prevalence of 1.5% among individuals of Chinese descent in the GTA and no association between those who screened positive for HBsAg and HBV knowledge. Variation in observed prevalence may be attributed to selection bias as outreach at health fairs and educational events would likely capture participants who are more conscious of their health status, and therefore are likely already aware of their hepatitis B status. The lower observed prevalence may also correlate with the mean knowledge and awareness questionnaire score of 70.8% indicating that individuals who participated were relatively informed and aware of HBV.

Consistent with the literature was the correlation of demographic factors such as income level and education with HBV knowledge (18–20). Published literature has identified age as a predictor of HBV knowledge due to significant associations with internet literacy and use as a means to provide health information (11). Despite observing a slightly younger average age among those with high HBV knowledge scores, we did not observe a significant effect of age as a predictor of high HBV

Table 3: Logistic regression results where missing values were handled using multiple imputation

Characteristic	Odds ratio	95% Confidence interval	*p* value
Age	0.99	0.97, 1.00	0.2
Sex			
Female	—	—	
Male	1.08	0.78, 1.48	0.7
Education			
None or Primary	—	—	
Secondary	1.34	0.87, 2.06	0.2
Post-secondary	2.19	1.41, 3.39	<0.001
Employment			
Unemployed	—	—	
Employed	0.78	0.47, 1.29	0.3
Retired	1.47	0.93, 2.30	0.10
Marital status			
Single/Never married	—	—	
Married or Common Law	1.19	0.73, 1.94	0.5
Divorced, widowed or separated	1.01	0.56, 1.79	>0.9
Income			
<$25,000	—	—	
$25,000 to <$50,000	1.52	0.93, 2.47	0.093
$50,000 to <$75,000	2.74	1.39, 5.43	0.004
>$75,000	2.10	0.98, 4.53	0.057
Familial history of HBV			
No	—	—	
Yes	1.72	1.06, 2.78	0.027
Do not know	0.80	0.56, 1.14	0.2
Migrant status			
Born in Canada/ >30 years in Canada	—	—	
Immigrant <30 years in Canada	0.86	0.60, 1.22	0.4
HBV screening result			
Negative	—	—	
Positive	1.06	0.34, 3.38	>0.9

Note: Multiple imputation approach used 50 iterations of 20 imputed datasets. Results were generated from pooled estimates.
HBV = hepatitis B virus

knowledge. Correlation of educational attainment with HBV knowledge in previous studies has been mixed, as general literacy, often present in migrant populations that have a high proportion of college and university graduates such as the one presented here, may not translate into health literacy (18).

Among immigrant populations, language and literacy, HBV-related stigma, and cultural myths/misconceptions are common barriers that create challenges to accessing HBV testing and care (21). To address these barriers, meaningful engagement through tailored HBV educational programming is necessary to promote detection, screening, vaccination, and linkage to care (21). This study demonstrated the potential for culturally tailored and sensitive HBV outreach initiatives to engage a large cross-section of community members across a variety of settings to promote HBV awareness and testing. Building on this outreach campaign, having HBV educational programming in multilingual settings, providing resources in multiple languages, and partnership with government and community-based organizations have all been shown as means to maximize exposure and reach of HBV educational initiatives (21).

In Canada, there is currently a notable lack of approved POC tests for HBV (22). The observed high participation rate may highlight the potential acceptability of POC testing in high-traffic areas as a case-finding strategy for those who otherwise might not have access to, or be regularly engaged with, traditional routes to testing, like physician and laboratory appointments. The incorporation of on-site screening and facilitating an individual's referral to further care as a part of HBV outreach campaigns has been shown to bridge service gaps and prevent transmission (21). As the Public Health Agency of Canada (PHAC) currently recommends that migrants receive opportunistic screening for HBV in Canada (23), POC testing can provide the opportunity to engage individuals in HBV testing services outside of the conventional laboratory setting, expediting clinical decision-making and improving follow-up rates.

LIMITATIONS

The data presented here are limited to engagement with POC screening offered during the campaign and the knowledge and awareness questionnaire, and do not include an evaluation of follow-up rates or linkage to care. There was also no baseline score

on the knowledge and awareness questionnaire available to compare to the scores of this cohort, as the questionnaire was developed for this outreach campaign. This prevents an analysis of how this group's knowledge of HBV may compare to the general population, or other groups with comparable demographic characteristics. Collapsing and recategorization of categorical variables, although adding clarity to our interpretation and addressing low frequency responses, may have also contributed to loss of detail in our analyses. Additionally, unmeasured characteristics such as language proficiency and health care provider language can affect the understanding of health information (21), thus potentially affecting HBV knowledge and awareness.

For the multivariate logistic regression analyses, the proportion of individuals missing data for one or more of the included covariates resulted in the inclusion of 542 (60.8%) participants. A limitation of the complete case analysis approach is the potential biasing of results by deleting missing observations (24). To mitigate this effect, we used the MICE approach to account for incomplete data and contrasted results against those obtained through complete case analysis.

CONCLUSION

Understanding how well people are aware of HBV is an essential step in the improvement of outreach and educational campaigns. Increasing awareness will empower those at risk to pursue HBV testing and instill the importance of receiving both vaccinations and treatments. Based on our findings, for individuals of Chinese descent, educational campaigns would fill the largest gaps in knowledge and awareness by focussing on topics of HBV transmission and targeting those with lower income level and educational attainment. Coupled with education, POC testing at outreach campaigns enables us to effectively reach large numbers of people, requiring minimal training, and support facilitating referrals to care for those infected. When combined, POC testing and educational outreach can be tailored to successfully help specific groups address HBV, supporting progress towards achieving the targets necessary for HBV elimination as a public health threat by 2030.

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Table S1: Demographics of participants stratified by low and high knowledge sore

Characteristic	Low knowledge score (*N* = 310 [34.8%])	High knowledge score (*N* = 581 [65.2%])
Age, Mean (SD)	65.7 (13.3)	63.8 (12.8)
Missing	10	23
Age category, *N* (%)		
18–34	5 (1.6%)	20 (3.4%)
35–54	55 (17.7%)	86 (14.8%)
55–74	158 (51.0%)	350 (60.2%)
75+	82 (26.5%)	102 (17.6%)
Missing	10 (3.2%)	23 (4.0%)
Sex, *N* (%)		
Female	199 (64.2%)	353 (60.8%)
Male	106 (34.2%)	222 (38.2%)
Missing	5 (1.6%)	6 (1.0%)
Education, *N* (%)		
None or Primary	67 (21.6%)	69 (11.9%)
Secondary	120 (38.7%)	186 (32.0%)
Post-secondary	112 (36.1%)	312 (53.7%)
Missing	11 (3.5%)	14 (2.4%)
Employment, *N* (%)		
Unemployed	55 (17.7%)	85 (14.6%)
Employed	77 (24.8%)	158 (27.2%)
Retired	167 (53.9%)	316 (54.4%)
Missing	11 (3.5%)	22 (3.8%)
Marital status, *N* (%)		
Single/Never Married	35 (11.3%)	68 (11.7%)
Married or Common Law	200 (64.5%)	413 (71.1%)
Divorced, widowed or separated	61 (19.7%)	80 (13.8%)
Missing	14 (4.5%)	20 (3.4%)
Income, *N* (%)		
<$25,000	149 (48.1%)	238 (41.0%)
$25,000 to <$50,000	37 (11.9%)	98 (16.9%)
$50,000 to <$75,000	14 (4.5%)	65 (11.2%)
>$75,000	13 (4.2%)	55 (9.5%)
Missing	97 (31.3%)	125 (21.5%)
Familial history of HBV, *N* (%)		
No	161 (51.9%)	290 (49.9%)
Yes	30 (9.7%)	87 (15.0%)
Do not know	84 (27.1%)	123 (21.2%)
Missing	35 (11.3%)	81 (13.9%)
Migrant status, *N* (%)		
Born in Canada or >30 years in Canada	70 (22.6%)	147 (25.3%)
Immigrant <30 years in Canada	234 (75.5%)	422 (72.6%)
Missing	6 (1.9%)	12 (2.1%)
HBV screening result, *N* (%)		
Positive	5 (1.6%)	8 (1.4%)

Notes: Low knowledge score was characterized as below 9 correct out of 13, and high knowledge score as greater than or equal to 9 correct out of 13
HBV = Hepatitis B Virus; SD = standard deviation

Table S2: Multivariable logistic regression results where missing values were handled using complete case analyses (*N* = 542)

Characteristic	Odds ratio	95% confidence interval	*p* value
Age	0.98	0.96, 1.00	0.12
Sex			
Female	—	—	
Male	0.93	0.62, 1.40	0.7
Education			
None or primary	—	—	
Secondary	1.77	1.04, 3.02	0.035
Post-secondary	2.37	1.38, 4.07	0.002
Employment			
Unemployed	—	—	
Employed	0.74	0.37, 1.43	0.4
Retired	1.66	0.89, 3.08	0.11
Marital status			
Single/Never married	—	—	
Married or Common law	1.33	0.69, 2.52	0.4
Divorced, widowed or separated	0.80	0.38, 1.68	0.6
Income			
<$25,000	—	—	
$25,000 to <$50,000	1.36	0.81, 2.32	0.2
$50,000 to <$75,000	6.26	2.40, 19.8	<0.001
>$75,000	2.07	0.92, 4.89	0.086
Familial history of HBV			
No	—	—	
Yes	2.05	1.11, 3.97	0.026
Do not know	0.78	0.51, 1.20	0.3
Migrant status			
Born in Canada/ >30 years in Canada	—	—	
Immigrant <30 years in Canada	0.99	0.63, 1.55	>0.9
HBV screening result			
Negative	—	—	
Positive	1.02	0.23, 5.29	>0.9

Note: Complete case analysis included 542 participants were included in the multivariate regression due to 349 having missing or unknown response
HBV = Hepatitis B virus